

A brief field guide to stream algae, or: just what is that slimy green stuff?

When you walk by a stream, chances are you may glance at it, see some slimy green stuff, and not think too much about it beyond “eeuw- slimy green stuff”. But the algae that grow in streams are actually an incredibly complex and varied group of organisms; some are even beautiful to look at. And, like their cousins the vascular plants (such as cattails, watercress, and bulrushes), they are an indispensable part of a healthy ecosystem, providing food and shelter for the fish, frog, and insect denizens of the stream. Through photosynthesis, they remove carbon dioxide from the air and water and use sunlight to turn it into the sugars, starches, and other carbohydrates that everyone from bacteria to humans needs to survive.

In most cases, growth of algae is kept in check by hungry stream herbivores – mostly snails, tadpoles, and insects. However, increases in the density of human populations near streams often increase inputs of algal growth-stimulating nutrients such as nitrogen and phosphorus. Through fertilization of nearby lawns, gardens, and agricultural fields, effluent from wastewater treatment plants, and even car exhaust, people can increase nutrient levels enough to have dramatic effects on stream communities. Large accumulations of algae can use up all of the oxygen in the water, suffocating fish and invertebrates, reducing biodiversity and decreasing the natural beauty of the stream.

Here along the south coast, we have a whole range of stream types, from those under strong human influence, dominated by large masses of one or two species of algae, to more pristine streams which support diverse communities with dozens of species in any given square meter. Next time you walk by a stream, take a closer look at the green stuff – here are some of the algae you are likely to find:

Among the green algae, two very cosmopolitan types are *Cladophora* and *Rhizoclonium*. Closely related, both form long, coarse filaments which can be seen waving in the current like thick, dark green hair. These algae respond strongly to increases in nutrients, forming thick mats in highly impacted streams.

In streams with less human influence, small clouds of lighter green algae floating in still water at the edges of sunny pools are likely to be *Spirogyra*, the only algae ever immortalized by a 1970’s jazz fusion band. Also known as watersilk, individual strands of *Spirogyra* are so fine that clusters of it actually feel silky when you rub them between thumb and forefinger.

In addition to the highly visible green algae, every stream has millions upon millions of microscopic golden brown algae, or diatoms, growing on almost every surface – rocks, sand, roots of plants, whatever is available. These tiny, beautiful, single-celled organisms build hard shells with intricate shapes and patterns. Although individuals are too small to be seen with the naked eye, the golden brown algae form diverse, complex communities, with some growing tall and upright on stalks sticking out from a rock surface, some laying low and flat, sticking close to the surface, and some in between - a microscopic version of a rainforest, with its multiple levels of tall trees, short understory plants, and everything in between. Pick up a rock from your local stream – does it have a light brown film on it? Does it feel a little slimy to the touch? That’s the diatom community, and you’re holding an entire miniature rainforest in your hand!

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Photo1 (Pediastrum): Microscopic green algae: a colony with a large intercellular space of Pediastrum collected from a local creek, approximately 90 microns (10^{-9} meters) in diameter.

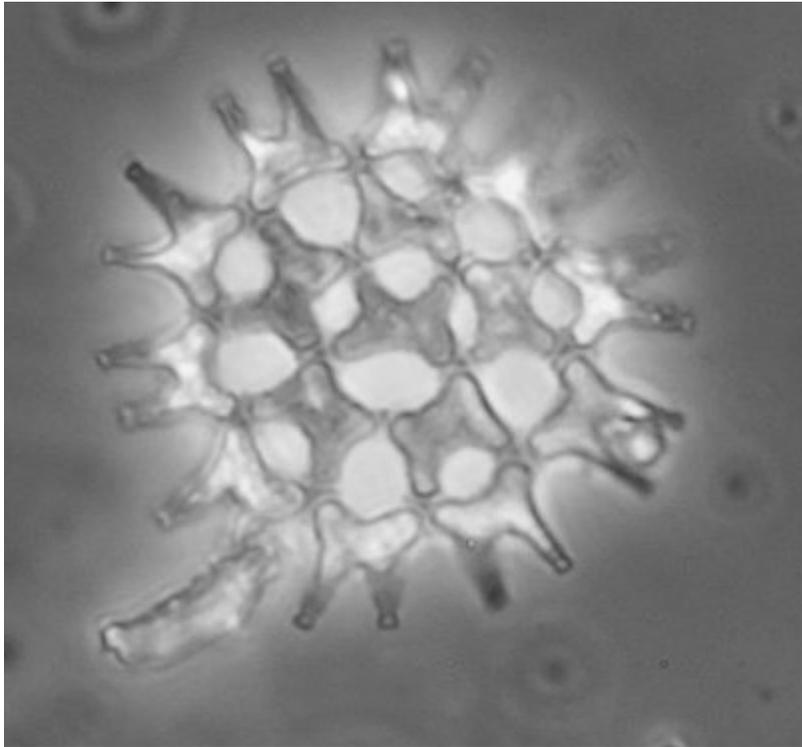


Photo2 (Cocconeis): An electron micrograph of Cocconeis, a common golden-brown diatom found in local streams. Each diatom is approximately four hundredths of a millimeter long. They grow attached to the substrate in streams and are part of a group of algae called epiphytes.

